Movable platform unit for a boat, particularly for hauling and launching tenders and the like

The present invention relates to a movable platform unit for a boat, intended in particular for launching or hauling out a tender or similar water craft, of the type described in the preamble to Claim 1.

It is known that certain categories of vessels, such as yachts, use small cranes, generally positioned in the stern, for lowering into the water or hauling out small tenders.

The use of movable platforms, which can be lowered beneath the surface of the water for launching a tender, is also known in the art. German patent DE 19 963 057 and German utility model DE 29 922 612, for example, describe a platform unit of the type referred to above. This platform unit has a plurality of arms which move in pantograph style, giving the platform enough range of movement that it can also be used as a gangway for passengers to move from one vessel to another.

The versatility of this known platform unit is fairly limited however: the range of movement which can be achieved only enables the platform to reach a landing stage or boat deck having heights which are not much different from that of the vessel on which it is installed. In addition, the platform cannot be retracted, meaning that is always on view even when not in use. This is a disadvantage from an aesthetic point of view, especially in the case of a yacht, wherein such an aspect is often of great importance.

These problems are overcome according to the invention by providing a platform unit having the characteristics claimed in Claim 1.

Preferred embodiments of the invention are described in the dependent Claims.

In particular, in some of these embodiments, the platform unit has automatically adjustable steps, which provide easy access to and from the vessel, whatever the height of the movable platform. The platform unit of the invention can therefore also be used as a ladder for swimmers to get in and out of the water.

These and other objects will become more apparent from the detailed description of a preferred, but non-limitative embodiment of the invention, provided with reference to the appended drawings, in which:

Figure 1 is a perspective view of a platform unit for a vessel according to the present invention, shown in a first operating position;

Figure 2 is a perspective view of the platform unit of Figure 1 in a second operating position;

Figure 3 is a perspective view of a structure of the platform unit of Figure 1 in the second operating assembly;

Figure 4 is a plan view from above of the structure of Figure 3 in the first operating position;

Figure 5 is a schematic side elevation view of a platform unit according to the present invention;

Figure 6 is a sectioned view of the structure of Figure 4 taken on the line VI-VI of this Figure;

Figure 7 is a sectioned view of the structure of Figure 4 taken on the line VII-VII of this Figure;

Figure 8 is a sectioned view of the structure of Figure 4 taken on the line VIII-VIII of this Figure; and

Figure 9 is a view of a vessel fitted with a platform unit of the invention.

With reference to Figure 1, a platform unit 1 according to the invention is shown, which is intended to be mounted preferably in the stern portion of a vessel. The platform unit 1 includes a base 2, with a movable platform 3 pivoted thereon and shown in a closed position in Figure 1. The base 2 can have means (not shown) for enabling the unit 1 to be fixed to the structure of the vessel or, in an alternative embodiment, can be incorporated into the structure of the vessel.

With reference to Figure 2, the platform unit 1 is shown in its fully extended position. The base 2 of this unit has a cavity 21 for housing the movable platform 3. The cavity 21 is shaped so that, in its closed position, the platform 3 precisely fits the overall shape of the base 2, as illustrated in Figure 1. The cavity 21 also houses a pair of fixed arms 22a, 22b.

As can be seen better in Figure 3, the fixed arms 22a, 22b have respective fixing plates 23a, 23b for mounting them on the base 2 by conventional fixing means, such as bolts, for example. Swing arms 32a, 32b are connected to the distal ends of the fixed arms 22a, 22b, respectively, so that they can turn in a vertical plane, perpendicular to the overall plane of the base 2 of the platform unit 1 (each in the direction indicated by the arrow A). The swing arms 32a, 32b and a plurality of steps 35 connected thereto form a ladder, which is orientable in a vertical plane. Each step 35 is turnable

about its own longitudinal axis relative to the swing arms 32a, 32b (in the direction shown by the arrows B1). The top step 35a is secured to the base 2 of the platform unit 1 by a pair of brackets 36a, 36b fixed by one end to the ends of the step 35a and by the other to the base 2 itself.

The distal ends of the swing arms 32a, 32b are finally connected by a cross member 37, also turnable about its longitudinal axis relative to the swing arms 32a, 32b (in the directions indicated by the arrows B2). A pair of supports 38a, 38b is fixed one to each end of the cross member 37, being thus pivoted on the swing arm 32a, 32b. It can be seen that the supports 38a, 38b are able to turn in a vertical plane relative to the swing arms 32a, 32b (in the sense indicated by the arrows B2) until they reach the closed position shown in Figure 4, folded along the arms 32a, 32b. The supports 38a, 38b are provided for mounting the movable platform 3, as shown in Figure 2.

The diagram shown in Figure 5 better illustrates the operation of the platform unit of the invention. This diagram consists of a side view of the platform unit 1 mounted on a boat, generally indicated B. An operating unit 50 includes a pair of single-acting hydraulic cylinders 51, 52, having respective rods 51a, 52a (slidable in the direction indicated by the arrows C1 and C2 respectively) secured to the end of a drive chain 55. The drive chain 55 passes over an operating pulley 57. As can be seen better from Figure 6, this pulley 57 is keyed onto a shaft 57a which is secured to the swing arm 32a. The pulley 57 and the swing arm 32a to which it is attached are pivoted on the bracket 36a so as to be able to turn about the axis x of the pulley 57 (along the arrows A). In order to increase the angle over which the chain 55

contacts the pulley 57 and to avoid non-axial stress on the cylinder rods, chain guides 58 are provided, shown in Figure 5.

The operating unit 50, controlled by a hydraulic control unit which includes a solenoid control valve 59, is at least partly enclosed within the fixed arm 22a (see Figure 2 by way of example), which is hollow for this purpose. The swing arm 32b naturally also has an operating unit, identical to that described above and controlled by the same control unit. The solenoid control valve 59 is connected separately to the cylinders 51, 52 through respective piloted unidirectional valves 59a, 59b, and is operable to control selectively either the upper cylinders 51 or the lower 52. Inserted into the bottom of the cylinders 51, 52, the piloted non-return valves 59a, 59b, selectively block flow of the hydraulic fluid, enabling the platform 3 to be locked into any position.

The rod-side chambers of the upper cylinders 51 and those of the lower cylinders 52 are in communication by means of a passage 59c, the function of which will be described later, Unidirectional flow-regulator valves 59d and 59e connect the solenoid valve 59 with the non-return valve 59a and the non-return valve 59b respectively.

The platform unit of the invention makes it possible to turn the swing arms 32a, 32b through a maximum angle of around 240º or even more from the closed position, in which the said arms 32a, 32b are lying flat on the base 2 of the platform unit 1, to the fully open position dependent on the particular arrangement of the axis x about which the arms 32a, 32b are pivoted.

The swing arm 32a, which is also hollow, contains an alignment unit 60 for ensuring that the steps 35 and the platform 3 retain their orientation relative to the base 2 during rotation of the swing arms 32a. To this end, each step 35 (as shown in Figure 7) is secured to a respective pulley 65, by means of the shaft onto which each pulley 65 is keyed. The shaft of each pulley 65 passes through the inward sidewall of the swing arm 32a. This means that the pulley 65 and its associated step 35 are pivoted on the swing arm 32a, so as to be rotatable about an axis parallel to the axis x. With reference to Figure 6, the step 35a is secured to the respective pulley 65a by means of the shaft 65b onto which this pulley 65a is keyed. The shaft 65b of the pulley 65a passes through the inward side wall of the swing arm 32a, coaxially with, but independently of the shaft 57a of the pulley 57 and is secured to the bracket 36a, thus ensuring that it remains immobile during rotation of the swing arm 32a. A final pulley 67, similar to the aforementioned pulleys 65 and 65a, is secured to the cross-member 37 (shown in Figure 3). With reference to Figures 5 and 8, an alignment chain 68 passes over the pulleys 65, 65a and 67 so as to ensure that the pulleys all rotate in unison.

With reference to Figure 8, in which only the swing arm 32a has been shown for the sake of simplicity, upper and lower tensioner devices 69a, 69b make it possible to increase the contact angle of the chain 68 over the pulleys 65, 65a, 67 and thereby to keep tension constant. The tensioner devices 69a, 69b preferably consist of a plurality of rollers carried on corresponding adjustable eccentric pins 71a. The eccentric pins 71a associated with the upper tensioner devices 69a are connected to each other by a chain 72a which ensures that the position of the platform 3 and the steps 35 is adjusted

evenly, by applying the same deformation to each free portion of the alignment chain 68. The lower tensioner devices 69b are also connected by a chain 72b, in an arrangement which is the same as that just described and so will not be described here.

With reference to Figure 5, operation of the platform unit of the invention when in its initial, closed position will now be described. An operator causes the hydraulic control unit to introduce fluid through the bottom of the upper cylinders 51. The oil contained in the rod-side chambers of the upper cylinders 51, flows through the passage 59c and into the rod-side chambers of the lower cylinders 52. The rods 52a slide in the cylinders 52, drawing along the lower branch of the chain 55 and thereby causing the pulley 57 to rotate. As a result, the swing arms 32a, 32b rotate, moving upwards and away from the closed position. Once the swing arms 32a, 32b have reached a vertical position, this movement is controlled by the one-way flow-regulator valve 59e, arranged in the hydraulic unit, which provides sufficient counter-pressure on the hydraulic return duct to exert a braking action on the platform 3, which is descending on the supports 38a under the weight of the structure and of any load carried on the platform 3. An additional one-way flow regulator 59d is arranged on the other branch of the hydraulic supply system and carries out the same function of descent controlling, when the movement is in the opposite direction, that is when the platform is being returned to its closed condition.

As described above, the rod-side chambers of the upper cylinders 51 and lower cylinders 52 are in free communication with each other, and connectable to an external control unit by means of respective connectors fitted with unidirectional

valves 59a, 59b: by introducing pressurized fluid through these valves, it is possible to compensate for play in the chain 55 and to ensure that this chain 55 is pre-tensioned, thereby avoiding any abrupt acceleration at the instant of change of direction of the resisting moment, due to the load on the platform 3 (that is in a condition in which the swing arms 32a, 32b are vertical).

In a preferred embodiment of the invention, the rod-side chambers of the upper cylinders 51 and lower cylinders 52 can be in communication with a compensation chamber 80, with a manually controlled piston (by means of a nut and a screw, for example) for compressing the oil inside the rod-side chambers of the cylinders 51 and 52 so as to enable any slack in the chain 55 to be taken up by a simple manual operation, without it being necessary to connect a control unit.

When the fluid supply is interrupted, the platform 3 is stopped at the required height and is kept there by the non-return valves 59a, 59b which prevent the fluid from flowing out of the upper cylinders 51, thereby maintaining tension on the chain 55. In order to return the platform 3 to its closed position, the cylinders 51, 52 are operated in reverse order.

The alignment unit 60 makes it possible to keep the steps 35 and the platform 3 in a constant horizontal position all the time while the swing arms 32a, 32b are moving, thanks to the alignment chain 68 secured to the fixed pulley 65a, which keeps the pulleys 65 and 67 aligned thereto.

It can easily be seen that by lowering the platform 3 so that the swing arms 32a, 32b are in their fully open position (as

shown in Figure 9), it is possible to lower the platform 3 beneath the surface of the water, making it possible to launch or haul back on board a tender or similar craft associated with the boat B, while the steps 35 give swimmers easy access to the water. It is also possible to vary the position of the platform 3, so as to access quays of different heights, while the fact that the platform 3 and the steps 35 always remain horizontal makes it easy to board or disembark from the boat B. In addition, the fact that the platform 3 always remains horizontal while it is being moved, gives easy access to people who are in any way disabled and also makes it easy to load heavy objects.